H. SAWYER & N. WHICHELLO.

MONORAIL TRACK SWITCH.

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1,047,451. Patented Dec. 17, 1912.

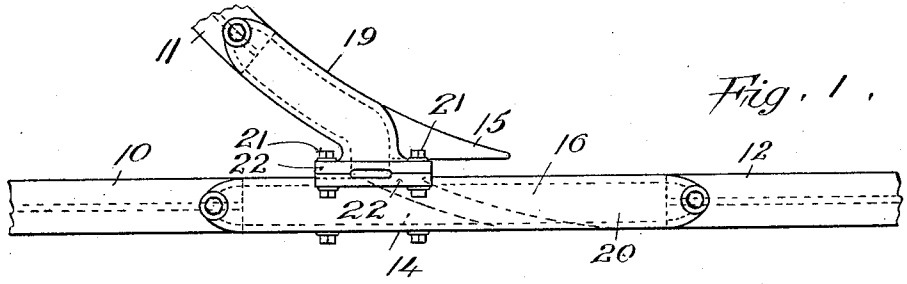

Fig. 1.

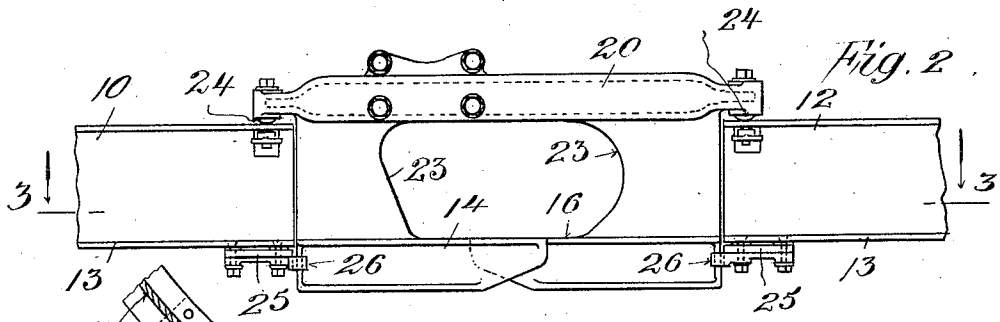

Fig. 2.

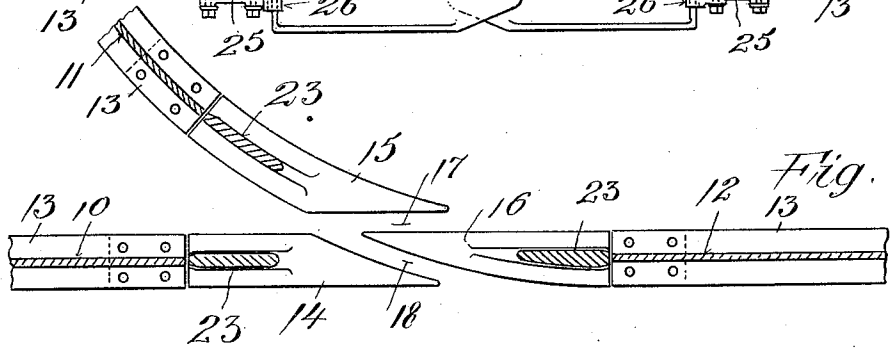

Fig. 3

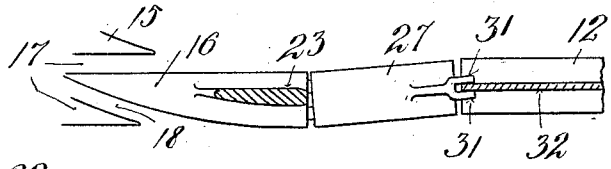

Fig. 5

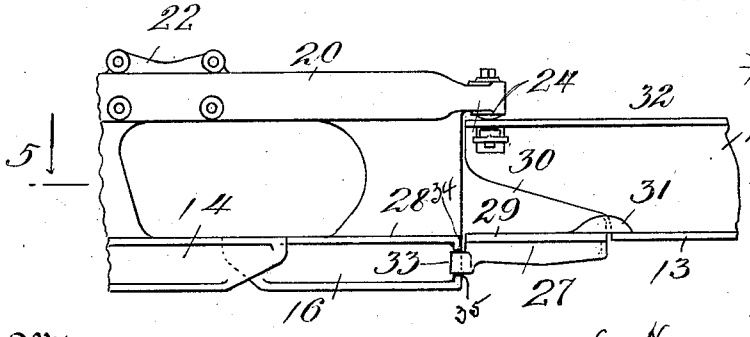

Fig. 4.

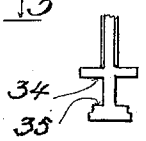

Fig. 6.

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UNITED STATES PATENT OFFICE.

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MONORAIL-TRACK SWITCH.

1,047,451. Specification of Letters Patent. Patented Dec. 17, 1912.

Application filed June 4, 1912. Serial No. 701,486.

To all whom it may concern:

Be it known that we, HARRY SAWYER, a citizen of the United States, and NORMAN WHICHELLO, a subject of the King of Great Britain, both residing at Muskegon, county of Muskegon, State of Michigan, have made a certain new and useful Invention in Monorail-Track Switches, of which the following is a specification.

This invention relates to monorail track switches.

The object of the invention is to provide a self-contained track switch for monorails and which embodies within itself rigid connections between the switch tongues employed at the proximate end of track rails or at the junction of said rails.

A further object of the invention is to provide a monorail track switch of the character referred to with suitable means for attaching the same to the track rail or to the proximate or adjacent ends thereof.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference signs appearing thereon,—Figure 1 is a view in top plan of a monorail track switch embodying the principles of our invention, the monorails being broken off. Fig. 2 is a view in side elevation of the construction shown in Fig. 1. Fig. 3 is a view in horizontal section on the line 3, 3, Fig. 2, looking in the direction of the arrows. Fig. 4 is a view similar to Fig. 2, showing a slightly modified arrangement for attaching or connecting the monorail track switch to the ends of the track rails. Fig. 5 is a view in horizontal section on the line 5, 5, Fig. 4, looking in the direction of the arrows. Fig. 6 is a broken view in end elevation of the track switch tongue shown in Fig. 4.

The same part is designated by the same reference character wherever it occurs throughout the several views.

In Patents Nos. 1,000,124 and 1,000,136, granted to Harry Sawyer and to Norman Whichello, respectively, August 8th, 1911, for switches for overhead trolley tracks, are shown, described and claimed certain features and characteristics common to the arrangement shown and hereinafter described. In the patented devices referred to, the trolley is permitted to run through the track switch, following either the straight or the curved path, without requiring the switch itself to have any moving parts. However, the switch construction of the patents referred to are not self-contained. In each case there are three separate tongues which are individually attached, respectively, to their associated track rails. In such case the correct relative location of the three tongues of the switch, and therefore the correct width of the slot between them for the passage of the depending portion of the trolley is accordingly dependent on the correct location of the track rails. In accordance with the present invention it is proposed to provide a structure wherein the track switch is self-contained, that is to say, the various parts constituting the switch are associated and assembled in fixed relation with respect to each other, so that when applied in position between the proximate ends of adjacent track rails, or at the junction of track rails, the tongues will bear a fixed and definite relation with respect to each other, and their distances apart, that is, the slot between them remains fixed whatever may be the vertical displacement of the ends of the track or track rails.

We have selected for the purpose of illustrating the principles of our invention an arrangement wherein a track switch structure embodying our invention is interposed at the junction between the proximate ends of monorail tracks.

In the drawings, reference numerals 10, 11 and 12 designate, respectively, the proximate ends of three monorail track rails to the proximate or adjacent ends of which the switch device embodying our invention is to be applied. In the particular relation shown the track rails 10, 12 are arranged in line with each other while the rail 11, is arranged as a switch track to and from which a trolley may pass from or to the track rail portion 12. It is obvious that the particular form or construction of track rail is unimportant. While, therefore, we have shown our invention as applied to an I-beam construction having lateral flanges at the upper and lower edges thereof, it is un-

derstood that our invention is not to be limited or restricted in this respect. In the arrangement shown, the lateral flanges 13, at the lower edges of the track rails constitute the track along which the trolley wheels move or travel in their passage along said rail, or from one of said rail sections to another over or across the track switch of our invention. The switch tongues 14, 15, and 16 are designed to be associated respectively with the ends or proximate ends of the monorail track sections 10, 11 and 12, respectively. The relation of the tongues 14, 15 and 16, is such as to afford the desired width of space or passage 17, 18, therebetween, and in accordance with our invention the distance apart, that is the width of the slot 17, 18, remains fixed and definite, whatever may be the relation of the ends of the track rails 10, 11, 12. In order to accomplish this result the several switch tongues, 14, 15 and 16 are rigidly secured together in any suitable or convenient manner. That is to say, we propose to provide a suitable connection between the several tongues which serves to maintain these tongues in fixed relation with respect to each other, and this result may be accomplished in many specifically different ways. We have shown, as an illustrative embodiment of our idea, one arrangement for the purpose set forth wherein the switch section or tongue 15, is formed integrally with a casting 19, (see Fig. 1), while the switch tongues 14, 16 are similarly formed integrally with or form part of the casting 20, the two castings 19, 20, being rigidly secured together in any convenient manner, as, for instance, by means of the bolts 21, passing through flanges 22, respectively formed on the castings 19, 20. In this manner the castings 19, 20, are rigidly secured together, thereby holding the tongues 14, 15 and 16, in rigid relation with reference to each other and consequently maintaining the slots or passages 18, 17, of fixed and definite width.

In a track switch construction embodying our invention it is essential that the top portion or upper section of the track switch should be of such form and relation as to resist both bending and twisting strains. A suitable construction for accomplishing this result, and to insure against twisting and bending strain is shown, wherein the casting 20, is in the form of a hollow box, and, similarly, the casting 19, which rigidly secures the tongue 15 to the tongues 14, 16, through its connection with the casting 20, is also in the form of a hollow box. By this construction a strong, durable arrangement is provided which prevents and overcomes any tendency to lateral twisting or bending of the switch structure. The box like portions 19, 20, are connected in any suitable manner to, or are formed with the web portion 23, of the tongue sections of the switch. With suitable construction of castings 19, 20, and suitable thickness of the web portion 23, it will be understood that the tongue portions 14, 15, 16, will be held in correct relative location and relation with reference to each other without depending upon their connections with the ends of the track rails 10, 11, 12.

In the ordinary arrangement of overhead monorails or tracks, the beams or track rails 10, 11, 12, are rigidly supported in their relative positions and in the usual manner, not shown. The track switch is then placed in position between the proximate or adjacent ends of the track rails. In the construction shown the castings 19, 20, are extended at their upper ends so as to overhang somewhat the ends of the track rails. These overhanging ends of the castings 19, 20, are designed to rest and to be supported upon the upper surface of the tracks 10, 11, 12, or, as shown, upon the upper flanges, or the upper surfaces of the upper flanges of the I-beam where I-beams are employed. Thus it will be seen that the self-contained track switch rests upon the three points, only, which are afforded by the proximate ends of each of the track rails. It will also be observed that these points of support are at the top of the self-contained track switch construction, and in order to permit the track switch device to take and assume proper bearings upon the upper surfaces of the track rails notwithstanding any slight variations of vertical alinement of said track rails, the lower surfaces of the overhanging portions of castings 19, 20, as indicated at 24, are made rounded or spherical so that the track section device may automatically adjust and accommodate itself to any small or slight irregularity in the alinement or relative displacement of the upper surfaces of the track rails. With this construction it will be understood that the self-contained switch device embodying our invention will take up and assume a proper position even though the top surfaces of the track rails are not exactly on the same level and without creating any undue condition of strain or bend upon the said structure or the I-beams themselves.

It will be readily understood that if the three bearing points of the overhanging ends of the castings 19, 20 are the only connections between the track switch and the track beams, there would be in practice the danger of the lower flanges of the track rails or beams not being in lateral alinement with the switch tongues, and since the trolley wheels are supported and operate along the lower flanges of the track rails or beams it will be seen that such a condition would interfere with the smooth practical

operation and passage of the switch section by the trolley. Such danger, however, would not exist if the top flanges or upper surfaces of the trolley rails, upon which the switch track portion is supported, were truly on the same level, that is, if the switch part and the beam part did not depart, either initially or during the process of operating the trolley along the system, from their intended shapes, due to twists and strains imposed thereon. Since, however, these conditions of level relation of the upper surfaces of the track rails cannot always be secured, nor can the effects of twists and strains on the switch section or track rails be always guarded against, we prefer in practice to supplement the bearing support of the track switch section upon the upper surface of the track beams with some auxiliary form of connection between the tongues, or other suitable or convenient parts of the self-contained switch portions, and their associated track rails. In practice we prefer to locate the auxiliary connection at or in the vicinity of the lower flanges of the track rails.

In Figs. 1, 2 and 3, (see particularly Fig. 2), we have shown an auxiliary bracket or heel piece 25, which is rigidly bolted to the under surface of the lower flange of the track rails, as clearly shown, and which has a portion, indicated at 26, to embrace or straddle over the edge of the switch tongue. It will be understood that a heel piece 25, is bolted to the end of each of the track rails 10, 11, 12, and each heel piece is formed or otherwise constructed to engage the adjacent end portion of its associated tongue. A convenient arrangement is for the portion 26, of the heel piece to embrace the vertical edge of the track switch tongue associated therewith. By this arrangement the switch tongue and the lower flange of the track rail are definitely secured in lateral alinement with reference to each other. Should there be imposed any strain either on the switch tongue or on the track rail tending to carry these two out of alinement with each other, the heel piece will serve to resist such strain and tendency. It is obvious that any other suitable or convenient manner of connecting the ends of the tongues to the proximate ends of their associated track members, might readily occur to persons skilled in the art and still fall within the spirit and scope of our invention as defined in the claims.

In Figs. 4, 5 and 6, we have shown a slightly modified arrangement. In this construction instead of the heel piece which embraces the vertical outer edges or ends of the switch tongues, and which, in turn, are rigidly secured to the under surface of the lower flanges of the track beams, we employ what we shall term bridge pieces 27, interposed between the proximate ends of the switch tongues and their associated track beams. That is to say, between each switch tongue and its associated rail, a bridge piece 27, is interposed. The bridge piece 27, is provided with a flange 29, which is arranged to rest in the same horizontal plane with the upper surface of the lower flange 13, of the track rails also with the flange 28, of the tongue sections 16, 15, 14. The alined upper surfaces of the flanges 13, 29, 28, constitute the track along which the wheels of the trolley move. In this form of our device the end of the track rail 12, is cut away as indicated at 30, and the bridge piece 27, is provided with flanges or lugs 31, as clearly indicated in Fig. 5, which embrace or straddle the vertical web portion 32, of the track rail. At their other ends the bridge portions 27, are provided with similar engaging portions 33, which embrace the proximate outer ends or vertical edges of the tongue sections 16, 15, 14, respectively and are received between the surfaces 34, 35 thereof. It will be observed that in the construction shown in Figs. 4 and 5, the switch tongues and the lower flange of the track rail are not necessarily held in line laterally and consequently no condition of strain is imposed thereon. At the same time, however, the arrangement shown secures a smooth passage along the switch construction from the end of one rail to the end or proximate end of another rail even though there is a slight derangement of the alined relation of these parts. In Fig. 5 we have shown such a displaced relation of the parts, the bridge piece 27, serving to compensate for any such derangement by automatically adjusting itself to the conditions encountered. In order that it may be capable of accomplishing this result, it will be understood that the connection of the bridge piece 27, to the track rail member, as well as to the tongue member, must be loose.

From the foregoing description it will be seen that we provide an exceedingly simple construction of self-contained switch structure device and means for attaching or connecting the same to the proximate ends of associated track rails where they meet, or at the junctions thereof where a switch track crossing or other relation of track rails is encountered. By being self-contained it will be observed that the switch tongues are constantly maintained in rigid relation with respect to each other notwithstanding slight variations in height or level of the track rail surfaces over which the trolley wheels operate, and notwithstanding the fact that the track rails may be slightly out of alinement with respect to each other.

Having now set forth the object and nature of our invention and construction embodying the principles thereof, what we

claim as new and useful and of our own invention, and desire to secure by Letters Patent of the United States, is,—

1. The combination with overhead monorail track members, of a switch device interposed between the proximate ends of said track members, said switch device comprising switch tongues, means for connecting said switch tongues together into rigid relation with reference to each other, said switch tongues having overhanging portions adapted to rest upon the track rails, and auxiliary means connecting the ends of said track rails to said switch tongues.

2. The combination with monorail track members, of a switch device interposed between the proximate ends of said track members and comprising tongues connected together into fixed or rigid relation with reference to each other, said tongues having overhanging portions adapted to rest upon the proximate ends of their associated track rails, and loose connections between the tongue members and the proximate ends of their associated track rails.

3. The combination with monorail track members, of a switch structure interposed between the proximate ends of said track members and comprising switch tongues, means connecting said switch tongues into rigid relation with reference to each other, said switch device adapted to rest upon the track rail members, and a heel piece rigidly secured to each of said track rail members, and loosely embracing the proximate edge of its associated tongue member.

4. The combination with monorail track members, and a switch device interposed between the proximate ends of said members and comprising switch tongues rigidly connected together into immovable relation with respect to each other, said switch member having overhanging portions arranged to rest upon the upper surfaces of the track members, and a heel piece rigidly secured to the proximate end of each of said track members, each heel piece loosely engaging the proximate end of its associated switch tongue member.

5. The combination with overhead track members of a switch device interposed between adjacent ends of said track members and comprising tongues connected together in rigid relation with reference to each other, said switch device having overhanging portions to rest upon the upper surfaces of the track members, said overhanging portions having rounded bearing surfaces to rest upon the track members.

6. In an overhead track switch, the combination of two switch tongues, a rigid connecting member formed integrally with said tongues, and a third separate switch tongue, a rigid member formed integrally therewith and means for detachably securing said rigid members together.

7. In an overhead track switch, the combination with a box shaped rigid member having depending webs formed integrally therewith adjacent its respective ends oppositely presented and separated switch tongues formed integrally with said webs and a second box shaped member having a web portion formed integrally therewith and a switch tongue formed integrally with said web portion and means for detachably securing said box shaped members together.

8. In a self-contained switch structure, switch tongues, means for rigidly connecting said switch tongues together in fixed and definite relation with reference to each other to form a complete independent structure and supporting track rails for the switch structure and means secured near the lower edges of the track rails and arranged to engage the proximate ends of the switch tongues on opposite sides thereof to prevent relative lateral movement of the switch structure and rails.

9. In a self contained switch structure, switch tongues, means for rigidly connecting them in fixed and definite relation to each other, supporting track rails therefor and loosely engaging connections intermediate the lower edges of the rails and switch tongues to prevent relative lateral movement thereof.

In testimony whereof we have hereunto set our hands in the presence of the subscribing witnesses, on this 16th day of May A. D., 1912.

HARRY SAWYER.
NORMAN WHICHELLO.

Witnesses:
J. L. HAGA,
J. WORKMAN.